IN THE CLAIMS

This listing of the claim will replace all prior versions and listings of claim in the present application.

Listing of Claims

Claims 1-4 (canceled).

5. (Previously Presented) A method for enhancing a digital image which includes a plurality of image pixels, said method comprising:

- constructing a histogram of pixel values from at least part of said image pixels;
- forming an inverse histogram from said histogram;
- forming a cumulative inverse histogram from said inverse histogram;
- deriving an inverse histogram-based pixel mapping function from said cumulative inverse histogram; and
- applying the inverse histogram-based pixel mapping function to a set of image pixels.

6. (Previously Presented) A method according to claim 5, wherein the step of constructing a histogram of pixel values comprises:

- defining a set of pixel value ranges; and
- for each pixel value range, counting the number of image pixels from said at least part of said image pixels that have values within that range.

7. (Previously Presented) A method according to claim 6, wherein said step of forming an inverse histogram from said histogram comprises:

- identifying a pixel value range having a maximum number of image pixels; and
- for each pixel value range, subtracting the number of image pixels within that range from said maximum number, thereby forming a modified value for each pixel value range.

8. (Previously Presented) A method according to claim 6, wherein said step of forming an inverse histogram from said histogram comprises:

- defining a reference value; and
- for each pixel value range, subtracting the number of image pixels within that range from said reference value, thereby forming a modified value for each pixel value range.

9. (Previously Presented) A method according to claim 6, wherein said step of forming an inverse histogram from said histogram comprises:

- identifying a pixel value range having a maximum number of image pixels;
- defining a reference value greater than said maximum number; and
- for each pixel value range, subtracting the number of image pixels within that range from said reference value, thereby forming a modified value for each pixel value range.

10. (Previously Presented) A method according to claim 7, 8, or 9, wherein said step of forming a cumulative inverse histogram comprises:

- for each pixel value range, adding to the modified value for that range, formed during said step of forming an inverse histogram, the modified values for all pixel value ranges comprising smaller pixel values than that range, formed during said step of forming an inverse histogram; and
- storing the value thus obtained in a corresponding pixel value range of the cumulative inverse histogram.

11. (Previously Presented) A method according to claim 10, wherein said inverse histogram-based pixel mapping function is derived from said cumulative inverse histogram using the value of each pixel value range of said cumulative inverse histogram.

12. (Previously Presented) A method according to claim 10, wherein said inverse histogram-based pixel mapping function is derived from said cumulative inverse histogram by interpolating between pixel value ranges of said cumulative inverse histogram.

13. (Previously Presented) A method according to claim 5, wherein said inverse histogram-based pixel mapping function is scaled to a predetermined maximum value.

14. (Previously Presented) A method according to claim 5, wherein said histogram of pixel values is processed to form a modified histogram before said step of forming an inverse histogram.

15. (original) A method according to claim 5, wherein said inverse histogram is processed to form a modified inverse histogram before said step of forming a cumulative inverse histogram.

16. (Previously Presented) A method according to claim 5, wherein said cumulative inverse histogram is processed to form a modified cumulative inverse histogram before said step of deriving an inverse histogram-based pixel mapping function.

17. (Previously Presented) A method for enhancing a digital image which includes a plurality of image pixels, said method comprising:

- constructing a histogram of pixel values from at least part of said image pixel values;
- forming a cumulative histogram from said histogram;
- deriving a mapping function from the cumulative histogram;
- forming an inverse histogram-based pixel mapping function from said mapping function; and
- applying the inverse histogram-based pixel mapping function to a set of image pixels.

18. (Previously Presented) A method according to claim 17, wherein said step of forming the inverse histogram-based pixel mapping function from said mapping function comprises:

- differentiating said mapping function to form a differentiated mapping function;
- finding the maximum value of said differentiated mapping function; and
- subtracting said maximum value from said differentiated mapping function and integrating the result.

19. (Previously Presented) A method according to claim 17, wherein the step of constructing a histogram of pixel values comprises:

- defining a set of pixel value ranges; and
- for each pixel value range, counting the number of image pixels from said at least part of said image pixels that have values within that range.

20. (Previously Presented) A method according to claim 19, wherein said step of forming a cumulative histogram comprises:

- for each pixel value range, adding to the number of image pixels within that range the number of image pixels in all pixel value ranges comprising smaller pixel values than that range.

21. (Previously Presented) A method according to claim 20, wherein said mapping function is derived from said cumulative histogram using a number of image pixels within each pixel value range of said cumulative histogram.

22. (Previously Presented) A method according to claim 20, wherein said mapping function is derived from said cumulative histogram by interpolating between pixel value ranges of said cumulative histogram.

23. (Previously Presented) A method according to claim 17, wherein said histogram of pixel values is processed to form a modified histogram before said step of forming a cumulative histogram.

24. (original) A method according to claim 17, wherein said cumulative histogram is processed to form a modified cumulative histogram before said step of deriving a mapping function.

25. (Previously Presented) A method according to claim 17, wherein said mapping function is processed to form a modified mapping function before said step of forming the inverse histogram-based pixel mapping function.

26. (Previously Presented) A method according to claim 5, wherein said inverse histogram-based pixel mapping function is modified to form a modified

inverse histogram-based pixel mapping function and said modified inverse histogram-based pixel mapping function is applied to the set of image pixels.

27. (original) A method according to claim 5, wherein said histogram is constructed from all image pixels of said digital image.

28. (original) A method according to claim 5, wherein said histogram is constructed from a part of all image pixels of said digital image.

29. (Previously Presented) A method according to claim 5, wherein said inverse histogram-based pixel mapping function is applied to the set of image pixels prior to or after applying another image processing function.

30. (original) A method according to claim 29, wherein said other image processing function has the effect of increasing pixel value variation.

31. (Previously Presented) A method according to claim 5, wherein the inverse histogram-based pixel mapping function is applied to the set of image pixels prior to or after applying an edge enhancement function.

32. (Previously Presented) A method according to claim 5, wherein the inverse histogram-based pixel mapping function is applied in an original signal

branch and an edge enhancement unit is applied in a branch parallel to the original signal branch.

33. (Previously Presented) A method according to claim 5, wherein the inverse histogram-based pixel mapping function is applied in an original signal branch and in a branch parallel to the original signal branch having an edge enhancement unit.

Claims 34 and 35 (cancelled).

36. (Previously Presented) An image processor for enhancing a digital image which includes a plurality of image pixels, comprising:

an input which inputs said image pixels; and

a processor which constructs a histogram of pixel values from at least part of said image pixels, forms an inverse histogram from said histogram, forms a cumulative inverse histogram from said inverse histogram, derives an inverse histogram-based pixel mapping function from said cumulative inverse histogram, and applies the inverse histogram-based pixel mapping function to a set of image pixels.

37. (Previously Presented) An image processor according to claim 36, wherein said processor forms a modified histogram from said histogram of pixel values.

38. (Previously Presented) An image processor according to claim 36, wherein said processor forms a modified inverse histogram from said inverse histogram.

39. (Previously Presented) An image processor according to claim 36, wherein said processor forms a modified cumulative inverse histogram from said cumulative inverse histogram.

40. (Previously Presented) An image processor for enhancing a digital image which includes a plurality of image pixels, comprising:

an input which inputs said pixels; and

a processor which constructs a histogram of pixel values from at least part of image pixel values of said image pixels, form a cumulative histogram from said histogram, derives a mapping function from the cumulative histogram, forms an inverse histogram-based pixel mapping function from said mapping function, and applies the inverse histogram-based pixel mapping function to a set of image pixels.

41. (Previously Presented) An image processor according to claim 40, wherein said processor forms a modified histogram from said histogram of pixel values.

42. (Previously Presented) An image processor according to claim 40, wherein said processor forms a modified cumulative histogram from said cumulative histogram.

43. (Previously Presented) An image processor according to claim 40, wherein said processor forms a modified mapping function from said mapping function.

44. (Previously Presented) An image processor according to claim 40, wherein said processor forms a modified inverse histogram-based pixel mapping function from said inverse histogram-based pixel mapping function.

45. (Currently Amended) A portable radio communication device comprising:

an input which inputs ~~said~~ image pixels; and

an image processor for enhancing a digital image comprising image pixels,

wherein said image processor , constructs a histogram of pixel values from at least part of said image pixels, forms an inverse histogram from said histogram, forms a cumulative inverse histogram from said inverse histogram, derives an inverse histogram-based pixel mapping function from said cumulative inverse histogram, and applies the inverse histogram-based pixel mapping function to a set of image pixels.

46. (Previously Presented) A computer program product comprising a computer usable medium having computer readable program code embodied therein for performing a method for enhancing a digital image according to claim 5.

Claims 47-51 (canceled).

52. (Previously Presented) A method according to claim 17, wherein said inverse mapping function is scaled to a predetermined maximum value.

53. (Previously Presented) A method according to claim 17, wherein the inverse histogram-based pixel mapping function is applied in an original signal branch and an edge enhancement unit is applied in a branch parallel to the original signal branch.

54. (Previously Presented) A method according to claim 17, wherein the inverse histogram-based pixel mapping function is applied in an original signal branch and in a branch parallel to the original signal branch having an edge enhancement unit.

Claims 55-60 (canceled).

61. (Previously Presented) A method according to claim 17, wherein said histogram is constructed from all image pixels of said digital image.

62. (Previously Presented) A method according to claim 17, wherein said histogram is constructed from a part of all image pixels of said digital image.

63. (Previously Presented) A method according to claim 17, wherein said inverse histogram-based pixel mapping function is applied to the set of image pixels prior to or after applying another image processing function.

64. (Previously Presented) A method according to claim 63, wherein said other image processing function has the effect of increasing pixel value variation.

65. (Previously Presented) A method according to claim 17, wherein the inverse histogram-based pixel mapping function is applied to the set of image pixels prior to or after applying an edge enhancement function.

66. (Previously Presented) A portable radio communication device comprising:

an input which inputs image pixels of a digital image; and

an image processor for enhancing said digital image, wherein said image processor constructs a histogram of pixel values from at least part of said image pixel values, forms a cumulative histogram from said histogram, derives a mapping function from the cumulative histogram, forms an inverse histogram-based pixel

mapping function from said mapping function, and applies the inverse histogram-based pixel mapping function to a set of image pixels.

67. (Previously Presented) A computer program product comprising a computer usable medium having computer readable program code embodied therein for performing a method for enhancing a digital image according to claim 17.

68. (Previously Presented) A method according to claim 5, wherein the inverse histogram-based pixel mapping function decreases the contrast of the digital image for image pixels that have values with a frequency of occurrence exceeding a pre-determined amount.

69. (Previously Presented) A method according to claim 68, wherein the inverse histogram-based pixel mapping function increases the contrast of the digital image for image pixels having values with a frequency of occurrence less than said predetermined amount.

70. (Previously Presented) A method according to claim 17, wherein the inverse histogram-based pixel mapping function decreases the contrast of the digital image for image pixels that have values with a frequency of occurrence exceeding a pre-determined amount.

71. (Previously Presented) A method according to claim 70, wherein the inverse histogram-based pixel mapping function increases the contrast of the digital image for image pixels having values with a frequency of occurrence less than said predetermined amount.

72. (Previously Presented) An image processor according to claim 36, wherein the inverse histogram-based pixel mapping function is arranged to decrease the contrast of the digital image for image pixels that have values with a frequency of occurrence exceeding a pre-determined amount.

73. (Previously Presented) An image processor according to claim 72, wherein the inverse histogram-based pixel mapping function is arranged to increase the contrast of the digital image for image pixels having values with a frequency of occurrence less than said predetermined amount.

74. (Previously Presented) An image processor according to claim 40, wherein the inverse histogram-based pixel mapping function is arranged to decrease the contrast of the digital image for image pixels that have values with a frequency of occurrence exceeding a pre-determined amount.

75. (Previously Presented) An image processor according to claim 74, wherein the inverse histogram-based pixel mapping function is arranged to increase

the contrast of the digital image for image pixels having values with a frequency of occurrence less than said predetermined amount.

76. (Previously Presented) An image processor according to claim 36, wherein said processor constructs said histogram of pixel values by, defining a set of pixel value ranges, and for each pixel value range, counting the number of image pixels from said at least part of said image pixels that have values within that range.

77. (Previously Presented) An image processor according to claim 76, wherein said processor forms said inverse histogram from said histogram by identifying a pixel value range having a maximum number of image pixels for each pixel value range, subtracting the number of image pixels within that range from said maximum number, thus forming a modified value for each pixel value range, and storing the value thus obtained in a corresponding pixel value range of the inverse histogram.

78. (Previously Presented) An image processor according to claim 76, wherein said processor forms said inverse histogram from said histogram by defining a reference value, for each pixel value range, subtracting the number of image pixels within that range from said reference value, thus forming a modified value for each pixel value range, storing the value thus obtained in a corresponding pixel value range of the inverse histogram.

79. (Previously Presented) An image processor according to claim 76, wherein said processor forms said inverse histogram from said histogram by identifying a pixel value range having a maximum number of image pixels defining a reference value greater than said maximum number, for each pixel value range, subtracting the number of image pixels within that range from said reference value, thus forming a modified value for each pixel value range, and storing the value thus obtained in a corresponding pixel value range of the inverse histogram.

80. (Previously Presented) An image processor according to claim 77, 78 or 79, wherein said processor forms said cumulative inverse histogram by adding to the modified value for each pixel value range, the modified values for all pixel value ranges comprising smaller pixel values and storing the value thus obtained in a corresponding pixel value range of the cumulative inverse histogram.

81. (Previously Presented) An image processor according to claim 80, wherein said processor derives said inverse histogram-based pixel mapping function from said cumulative inverse histogram using the value of each pixel value range of said cumulative inverse histogram.

82. (Previously Presented) An image processor according to claim 80, wherein said processor derives said inverse histogram-based pixel mapping function from said cumulative inverse histogram by interpolating between pixel value ranges of said cumulative inverse histogram.

83. (Previously Presented) An image processor according to claim 40, wherein said processor forms the inverse histogram-based pixel mapping function from said mapping function by differentiating said mapping function to form a differentiated mapping function, finding the maximum value of said differentiated mapping function subtracting said maximum value from said differentiated mapping function and integrating the result.

84. (Previously Presented) An image processor according to claim 40, wherein said processor constructs said histogram of pixel values by defining a set of pixel value ranges, and for each pixel value range, counting the number of image pixels from said at least part of said image pixels that have values within that range.

85. (Previously Presented) An image processor according to claim 84, wherein said processor forms said cumulative histogram by adding to the number of image pixels within each pixel value range, the number of image pixels in all pixel value ranges comprising smaller pixel values.

86. (Previously Presented) An image processor according to claim 85, wherein said processor derives said mapping function from said cumulative histogram using the number of image pixels within each pixel value range of said cumulative histogram.

87. (Previously Presented) An image processor according to claim 85, wherein said processor derives said mapping function from said cumulative histogram by interpolating between pixel value ranges of said cumulative histogram.

88. (Previously Presented) An image processor according to claim 36, wherein said processor constructs said histogram from all image pixels of said digital image.

89. (Previously Presented) An image processor according to claim 36, wherein said processor constructs said histogram from a part of the image pixels of said digital image.

90. (Previously Presented) An image processor according to claim 40, wherein said processor constructs said histogram from all image pixels of said digital image.

91. (Previously Presented) An image processor according to claim 40, wherein said processor constructs said histogram from a part of the image pixels of said digital image.